

NVM Express Technical Errata

Errata ID	024
Change Date	2/13/2012
Affected Spec Ver.	NVM Express 1.0b
Corrected Spec Ver.	

Submission info

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A typo correction is made to the Executing a Fused Operation example in section 7.2.5.2.

The Completion Timeout Value field of PXDC2 is corrected to be RW/RO from RO; it is dependent on whether this feature is supported by the device.

A typo in the Opcode value for Get Features in Figure 24 is fixed.

References to the End-to-End Data Protection section are corrected in several locations.

ECN 16 and 19 both used a Status Code value of 0Bh. This erratum correctly allocates Status Code values of 0Bh and 0Ch.

Description of the specification technical flaw:

Modify the third paragraph of section 7.2.5.2 as shown below:

The attributes of the Compare command are:

- CMD0.CDW0.OPC is set to 05h for Compare.
- CMD0.CDW0.FUSE is set to 01b indicating that this is the first command of a fused operation.
- CMD0.CDW0.CID is set to a free command identifier.
- CMD0.CDW1.NSID is set to the appropriate namespace.
- CMD0.MPTR is set to the address of the metadata buffer, if metadata is being used in a separate buffer.
- CMD0.PRP1 is set to the physical address of the first page of the data to compare.
- CMD0.PRP2 is set to the physical address of the PRP List. The PRP List is shown in **Error! Reference source not found.** for a PRP List with three entries.
- CMD0.CDW10.SLBA is set to the first LBA to compare against. Note that this field also spans Command Dword 11.
- CMD0.CDW12.LR is set to '0' to indicate that the controller should apply all available error recovery means to retrieve the data for comparison.
- CMD0.CDW12.FUA is cleared to '0', indicating that the data may be read from any location, including a DRAM cache, on the device.
- CMD0.CDW12.PRINFO is cleared to 0h since end-to-end protection is not enabled.
- CMD0.CDW12.NLB is set to **4h 3h**, indicating that **four logical blocks 4h LBAs** of a size of 4KB each are to be compared against.
- CMD0.CDW14 is cleared to 0h since end-to-end protection is not enabled.
- CMD0.CDW15 is cleared to 0h since end-to-end protection is not enabled.

Modify section 2.5.10 as shown below:

2.5.10 Offset PXCAP + 28h: PXDC2 – PCI Express Device Control 2

Bits	Type	Reset	Description
31:15	RO	0h	Reserved
14:13	RW	Impl Spec	OBFF Enable (OBFFE): This field controls the capabilities enabled for OBFF.
12:11	RO	00b	Reserved
10	RW	0	Latency Tolerance Reporting Mechanism Enable (LTRME): When set to '1', enables the LTR mechanism. When cleared to '0', the LTR mechanism is disabled.
09:05	RO	0h	Reserved
04	RW	0	Completion Timeout Disable (CTD): When set to '1', this bit disables the Completion Timeout mechanism.
03:00	RW/ RO	Impl Spec	Completion Timeout Value: Specifies the completion timeout value. If this feature is not supported in PXDCAP2, then this field is read only 0h.

Modify Figure 24 as shown below:

Figure 24: Opcodes for Admin Commands

Opcode (07)	Opcode (06:02)	Opcode (01:00)	Opcode	O/M	Namespace Identifier Used ³	Command
Generic Command	Function	Data Transfer				
0b	000 00b	00b	00h	M	No	Delete I/O Submission Queue
0b	000 00b	01b	01h	M	No	Create I/O Submission Queue
0b	000 00b	10b	02h	M	Yes	Get Log Page
0b	000 01b	00b	04h	M	No	Delete I/O Completion Queue
0b	000 01b	01b	05h	M	No	Create I/O Completion Queue
0b	000 01b	10b	06h	M	Yes	Identify
0b	000 10b	00b	08h	M	No	Abort
0b	000 10b	01b	09h	M	Yes	Set Features
0b	000 10b 000-00b	10b	0Ah	M	Yes	Get Features
0b	000 11b	00b	0Ch	M	No	Asynchronous Event Request
0b	001 00b	00b	10h	O	No	Firmware Activate
0b	001 00b	01b	11h	O	No	Firmware Image Download
I/O Command Set Specific						
1b	na	na	80h – BFh	O		I/O Command Set specific
Vendor Specific						
1b	na	na	C0h – FFh	O		Vendor specific

NOTES:

1. O/M definition: O = Optional, M = Mandatory.
2. Opcodes not listed are reserved.
3. A subset of commands uses the Namespace Identifier field (CDW1.NSID). When not used, the field shall be cleared to 0h. For the Get Features and Set Features command, the Namespace Identifier is only used for the LBA Range Type feature. For the Identify command, the Namespace Identifier is only used for the Namespace data structure. For the Get Log Page command, a value of FFFFFFFFh is used to specify that the global values should be returned.

Modify the last sentence of the first paragraph in the Protection Information Action and Protection Information Check fields in Figure 100.

Refer to section [8.2 8.3](#).

Modify the last sentence in the Expected Logical Block Application Tag Mask and Expected Logical Block Application Tag fields in Figure 107.

Refer to section [8.2 8.3](#).

Modify the last sentence in the Expected Logical Block Reference Tag, Expected Logical Block Application Tag Mask and Expected Logical Block Application Tag fields in Figure 122.

Refer to section [8.2 8.3](#).

Modify the last sentence in the Logical Block Application Tag Mask and Logical Block Application Tag fields in Figure 132.

Refer to section [8.2 8.3](#).

ECN 16 and ECN 19 assigned status code 0Bh to different uses. This ECN clarifies the assignment of 0Bh and 0Ch. Modify Figure 18 and 41 as shown below. ECN 19 is also being corrected.

Figure 18: Status Code – Command Specific Errors Values

Value	Description	Commands Affected
00h	Completion Queue Invalid	Create I/O Submission Queue
01h	Invalid Queue Identifier	Create I/O Submission Queue, Create I/O Completion Queue, Delete I/O Completion Queue, Delete I/O Submission Queue
02h	Maximum Queue Size Exceeded	Create I/O Submission Queue, Create I/O Completion Queue
03h	Abort Command Limit Exceeded	Abort
04h	Reserved	Reserved
05h	Asynchronous Event Request Limit Exceeded	Asynchronous Event Request
06h	Invalid Firmware Slot	Firmware Activate
07h	Invalid Firmware Image	Firmware Activate
08h	Invalid Interrupt Vector	Create I/O Submission Queue
09h	Invalid Log Page	Get Log Page
0Ah	Invalid Format	Format NVM
0Bh	Firmware Application Requires Conventional Reset	Firmware Activate
0Ch	Invalid Queue Deletion	Delete I/O Completion Queue
0Dh – 7Fh 0Ch – 7Fh	Reserved	
80h - BFh	I/O Command Set Specific	
C0 - FFh	Vendor Specific	

Figure 41: Delete I/O Completion Queue – Command Specific Errors Values

Value	Description
1h	Invalid Queue Identifier: The Queue Identifier specified in the command is invalid. This error is also indicated if the Admin Completion Queue identifier is specified.
0Ch	Invalid Queue Deletion: This error indicates that it is invalid to delete the I/O Completion Queue specified. The typical reason for this error condition is that there is an associated I/O Submission Queue that has not been deleted.

Disposition log

1/3/2012	Erratum captured.
1/25/2012	Updates to correct references to section 8.3 on end-to-end data protection.
2/13/2012	Moved hidden LBA range clarification to ECN 025, added corrections for allocation of 0Bh status code.
3/27/2012	Erratum ratified.

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